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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,891	12/02/2003	Chung-Ju Wu	82547	2424

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EXAMINER

VORTMAN, ANATOLY

ART UNIT	PAPER NUMBER
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2835

DATE MAILED: 10/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

42A

<b>Office Action Summary</b>	<b>Application No.</b> 10/724,891	<b>Applicant(s)</b> WU ET AL.	
	<b>Examiner</b> Anatoly Vortman	<b>Art Unit</b> 2835	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 December 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Specification*

1. 35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification is **replete with terms which are not clear, concise and exact.** The specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. **Examples** of some unclear, inexact or verbose terms used in the specification are: "The present invention generally relates to provide heat sink device..." (p.1, lines 7 and 8); "electronic devices suffers" (p. 2, line 22); "or plant to the electronic device" (p. 3, lines 5 and 6); "Referring to FIG. 1 and FIG. 2, show..." (p. 3, line 21); "Regard to FIG. 2..." (p. 4, lines 4 and 5); "so as to cause the chip or die 104 cannot operate" (p. 4, line 13); "to associate the cavity of the ball grid array package" (p. 4, lines 22 and 23); "two conductive pillar" (p.5, lines 7 and 8); "the protruding part in the central of the bottom plate" (p. 6, lines 2 and 3); "the heat that is generated die or chip" (p. 6, line 6), etc.

Also, the entire passages between lines 5 and 12 on p. 5 and between lines 20 and 24 on p. 9 are so cumbersome and idiomatically incorrect that it is hard to understand what the Applicant is trying to convey.

The Examiner would like to reiterate, that aforementioned are **only the examples**. The specification appears to be a literal translation into English from a foreign document and is, as stated above, **replete with grammatical and idiomatic errors**. There are numerous similar problems throughout the specification

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The Applicant is hereby advised to carefully review the entire specification and the abstract in order to correct the deficiencies as stated above.

A substitute specification in proper idiomatic English and in compliance with 37 CFR 1.52(a) and (b) is highly recommended. The substitute specification filed must be accompanied by a statement that it contains no new matter.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. The claims are generally narrative and indefinite, failing to conform with current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors (all remarks regarding "Specification" subsection above may also be applied to the claims).

**Examples are:** "having a protruding part in the central of said second part" (claim 1, line 9 of the claim); "wherein a conductive protruding block on the backside of said first heat dissipating element" (claim 4); "package having a cavity of embedded heat slug therein" (claim 10, lines 9 and 10 of the claim); "heat sink assembly having a shaping-unity" (claim 16, lines 5 and 6 of the claim); "a protruding part in the central" (claim 16, line 12 of the claim); "conductive material filled with at least said two holes" (claim 19), etc.

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Further, regarding independent claim 10, the last paragraph of the claim (from line 20 on p. 17 to the end of the claim) is so incomprehensible that examination on the merits of said claim 10 and of claims 11-15 depending thereon is precluded and will be postponed until appropriate corrections are made.

Further, there are numerous antecedent problems throughout the claims. **For example,** the following elements lack proper antecedent basis: “said two conductive pillars” (claims 8 and 9); “said ball grid array” (line 1 of claim 10); “said flip chip package” (line 8 of claim 17), etc.

The Examiner would like to reiterate, that aforementioned are **only the examples.** The claims appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors.

The Applicant is hereby advised to carefully review all pending claims of record in order to correct the deficiencies as stated above.

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3, 8, 9, and 16-20, **as best understood**, are rejected under 35 U.S.C. 102(b) as being anticipated by US/6154365 to Pollard, II et al. (Pollard).

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Regarding claim 1, Pollard disclosed (Fig. 2, 3) a heat sink device used for an integrated circuit package (34), said heat sink device comprises: a first part of heat sink assembly (42), said first part of heat sink assembly (42) having a first heat dissipating element (47) and a second heat dissipating element (43) on said first heat dissipating element (47); a printed circuit board (36) (column 2, line 30) having a flip chip package (34) thereon; and a second part of heat sink assembly (44), said second part of heat sink assembly (44) having a protruding part (46) in the center of said second part of heat sink assembly (44) and at least two openings (55) on the two sides of said second part of heat sink assembly (44), wherein said first part of heat sink assembly (42) is above said flip chip package (34) of said printed circuit board (36), and said second part of heat sink assembly (44) is below said flip chip package (34) of the printed circuit board (36).

Regarding claim 16, Pollard disclosed (Fig. 2, 3) a heat sink device used for an integrated circuit package (34), said heat sink device comprises: a first heat sink assembly (42), said first heat sink assembly having a first heat sink element (47), a second heat dissipating element (43) on said first heat dissipating element (47), and at least two conductive pillars (56) below said first heat dissipating element (47); a printed circuit board (36) having a grid array package (34) thereon, wherein said printed circuit board (36) having at least two holes (41) thereon; and a second heat sink assembly (44), having a protruding part (46) in the center and the at least two openings (55) on the two sides of said second heat sink assembly (44), wherein said first heat sink assembly (42) has at least said two conductive pillars (56) that passed through at least said two holes (41) of said printed circuit board (36), and joined with said openings (55) on said two sides of said second heat sink assembly (44).

Regarding the product-by-process claims 2 and 17, the method step of making (casting) of the device is not limiting of the structure. The method of forming the device is not germane to the issue of patentability of the device itself. Even though the claims are limited by and defined by the recited process (casting), the determination of patentability of the product is based on the product itself, and does not depend on its method of production. If the product in the product-by-process claims are the same as or obvious from a product of the prior art, the claims are unpatentable even though the prior product was made by a different process. *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985). Therefore, the claims have not been given patentable weight.

Regarding claims 3 and 18, Pollard disclosed that said second heat dissipating element (43) is a heat dissipating fin (Fig. 2, 3).

Regarding claim 8, Pollard disclosed (Fig. 3) two conductive pillars (56) below said first heat dissipating element (47).

Regarding claims 9 and 20, Pollard disclosed (Fig. 2, 3) at least two springs (52, 54) put around said two conducting pillars (56).

Regarding claim 19, Pollard disclosed (Fig. 2, 3) a conductive material (58) filling said two holes (55), whereby said two holes (55) connected with said two pillars (56).

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 4, **as best understood**, is rejected under 35 U.S.C. 103(a) as being unpatentable over Pollard in view of US/6,545,879 to Goodwin.

Regarding claim 4, Goodwin disclosed all, but a protruding block on the backside of the first heat dissipating element.

Goodwin disclosed (Fig. 2, 4) the heat sink cooling arrangement for an integrated circuit having a heat dissipating element (40) comprising a protruding block (56) on the backside of said heat dissipating element (40), which in conjunction with a pressure plate (60) provides good thermal connection with said integrated circuit, yet at the same time distributes the pressure on said integrated circuit more evenly (an approach notoriously known in the cooling art at the time of the invention).

It would have been obvious to a person of ordinary skill in the cooling art at the time the invention was made to utilize the approach of Goodwin and the general knowledge in the art by providing the heat sink device of Pollard with the protruding block on the backside of the first heat dissipating element and with the pressure plate in order to enhance thermal coupling and to more evenly distribute pressure over the surface of the integrated circuit chip.

8. Claims 5 and 7, **as best understood**, are rejected under 35 U.S.C. 103(a) as being unpatentable over Pollard in view of US/5,473,510 to Dozier, II (Dozier).

Regarding claims 5 and 7, Pollard disclosed all, but a conductive adhesive tape for adhering the first heat dissipating element and the integrated circuit package.



Dozier disclosed such an adhesive thermally conductive tape (110) (Fig. 1).

Since inventions of Pollard and Dozier are from the same field of endeavor (cooling arrangements for integrated circuits) and the utilization of the adhesive tapes for enhancing thermal coupling had been notoriously known and widely used in the cooling art at the time of the invention, the purpose of thermally conductive adhesive tape disclosed by Dozier would be recognized in the invention of Pollard.

It would have been obvious to a person of ordinary skill in the cooling art at the time the invention was made to provide a conductive adhesive tape for adhering the first heat dissipating element and the integrated circuit package of Pollard according to the teachings of Dozier and in light of the general knowledge in the art, in order to enhance thermal coupling between said integrated circuit package and said first heat dissipating element.

***Allowable Subject Matter***

9. Claim 6 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter: claim 6 recites the limitations: “an embedded heat slug with a cavity therein”. The aforementioned limitations in combination with all remaining limitations of claims 1 and 6, are believed to render the claim patentable over the art of record.

*Conclusion*

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

US/6936919, 6930884, 6657131, 6596565, 6462951, 6459582, 5552635, 5730620, 5738531, 5770891, 5847928, 5926371, 6061235, 6359783, 6395991, and 6400577 disclosed various cooling arrangements for integrated circuits.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anatoly Vortman whose telephone number is 571-272-2047. The examiner can normally be reached on Monday-Friday, between 10:00 am and 6:30 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ms. Lynn Feild can be reached on 571-272-2092. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Anatoly Vortman  
Primary Examiner  
Art Unit 2835

AV

